to bring home to the public the ease and safety of aeroplane travel.

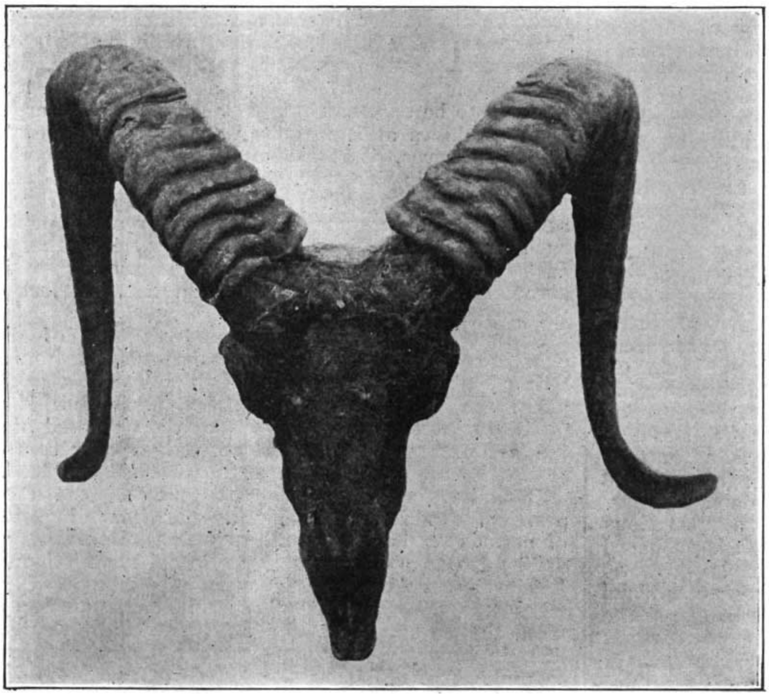
One important item of the programme was not carried out. It was announced that if the circumstances were favourable the Army dirigible "Beta" would come up from Aldershot and take part in the proceedings. The weather proved perfect, it being almost a dead calm with bright sunshine. The "Beta" was ready and actually made one ascent, but for some reason which has not been given out she did not attempt the journey. Advocates of the aeroplane as being a more practical apparatus than the dirigible claim this as a triumph for their cause.

B. Baden-Powell.

SPORT AND TRAVEL IN CENTRAL ASIA.[1]

This book, as its writer says, is merely "a plain record of a year's wanderings in the lesser known parts of Central Asia for the purpose of sport and travel." Its author had eyes for little else than the quest of large game for the sake of their heads as trophies. Of the country through which he passed or of its people, he tells us little, and nothing at all of its other fauna or its flora, and of many of the topics of human and scientific interest which the general reader expects to find in travel-books of little-known regions. Even in regard to the large game themselves the bald narrative provides no new facts nor any intimate study of the animals or their haunts. The photographs of the heads, however, are of some interest, as the specimens hitherto figured are not numerous and the limits of several of the species are not yet clearly defined. The account of the camp outfit also may supply some useful hints to sportsmen who contemplate an excursion in those regions.

Starting from Kashmir, the author crossed the Pamirs by the usual route, shooting on the way an *Ovis poli*, the horns of which measured (doubtless along their inner curve, as usual) "under 50 inches"; but he saw a pair on a tomb at Kashgar which were 72 inches. Beyond Turkestan, in the Thian Shan, he shot two specimens of the great stag generally termed the "Asiatic Wapiti" (*Cervus canadensis songdricus*), locally known as "Boga" by the Mongols, with horns measuring respectively 48 and 49 inches, the latter pair carrying 14 points or tines. A specimen of the *Ovis karelini*, with horns "just over 40 inches," was shot there, also the Turkestan ibex, with a horn length of 55 inches—the record being 57½ inches—and several Siberian roedeer (*Capreolus pygargus*). It is rather surprising to read that the skins were merely rubbed with crude wood ashes as a preservative and nothing else. Continuing northwards through Dsungaria, Lieut. Etherton sighted, on the plain of Lake Ebi, what he believed were wild horses (*Equus prejevalski*). The Altai was crossed in mid-winter, too late to attempt following the *Ovis ammon*, for which that range is famous, so our traveller turned down the steppes of the Irtish and Obi valleys to the Trans-Siberian Railway near Tomsk, where civilisation was reached once more.



Ovis Karelini. From "Across the Roof of the World."

NOTES.

In consequence of the Whitsuntide holidays, the annual visitation of the Board of Visitors to the Royal Observatory, Greenwich, will take place on Friday, June 2, instead of on Saturday, June 3.

The newly erected Cancer Research Institute at the Cancer Hospital is to be opened by H.R.H. the Duke of Connaught on Tuesday next, May 23, at 3 o'clock.

An earthquake shock was felt at 8.50 a.m. on Tuesday last in the Ullswater Valley.

We regret to learn from a Reuter telegram that Prof. Ernst Haeckel met with a serious accident on Tuesday. In endeavouring to reach a book from a high shelf he fell, breaking his hip bone.

We regret to notice the death, at the age of eighty-two years, of Sir Nathan Bodington, Vice-Chancellor of the University of Leeds.

The death is announced, at the age of sixty-five years, of Mr. Emerson M. Bainbridge, well known for his work in connection with coal-mining. In 1867 he was selected to report to the North of England Institute of Mining Engineers on the haulage of coal, and received for his services a valuable premium. Two years afterwards the Institution of Civil Engineers awarded him the Manby premium for a paper upon the probability of working coal at a depth of 4000 feet. Another paper, on the prevention of colliery explosions, was rewarded by the conferment of one of the Herman prizes. Mr. Bainbridge was a member of the Royal Commission on Coal Dust in Mines in 1891, and a juror of the Inventions Exhibition of 1883.

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[1] "Across the Roof of the World."—A Record of Sport and Travel through Kashmir, Gilgit, Hunza, the Pamirs, Chinese Turkistan, Mongolia and Siberia. By Lieut. P. T. Etherton. Pp. xvi+437 (London: Constable and Co., Ltd., 1911). Price 16*s.* net.

IT is announced in the *Revue scientifique* that a committee has been formed for the purpose of erecting a monument to the late M. Bernard Brunhes, who died last May at the age of forty-two years. M. Brunhes was for ten years director of the observatory at Puy-de-Dôme.

A MEETING of the Society of Tropical Medicine and Hygiene will be held at 11 Chandos Street, Cavendish Square, to-morrow—Friday—evening, when a discussion on the present position of the prophylaxis of malaria by quinine will be opened by Dr. W. Carnegie Brown, and a paper on the nature of Zambezi fever, by Dr. W. I. Bruce, of Chinde, and a note on cultural characteristics of a variety of the streptothrix of white mycetoma, by Dr. N. F. Surveyor, of Bombay, will be presented.

THE 129th Harveian Festival of the Royal College of Physicians of Edinburgh is to be held to-morrow, May 19, when Sir Alexander R. Simpson will deliver an oration on "Life and its Epiphanies."

THE Faraday Society has organised a general discussion on high temperatures, to be held on Tuesday, May 23, at the Institution of Electrical Engineers, Victoria Embankment, W.C. The following programme has been arranged:—Dr. Arthur L. Day will read a paper on recent advances in gas thermometry; Dr. J. A. Harker, F.R.S., will describe the high-temperature equipment at the National Physical Laboratory; Mr. H. C. Greenwood will read a note on boiling points of metals; and Mr. A. Blackie will speak on the behaviour of silica at high temperatures. Contribution to the discussion have been promised by Prof. Bodenstein on the maintenance of constant high temperatures, M. Féry on stellar pyrometry, and others. Dr. R. T. Glazebrook, F.R.S., director of the National Physical Laboratory, will preside. During the afternoon the society, by the invitation of the director, will visit the National Physical Laboratory to inspect the high-temperature equipment of the laboratory.

DR. HENRY HEAD, F.R.S., will deliver the Croonian lectures (upon "Sensory Changes from Lesions of the Brain") before the Royal College of Physicians of London on June 13, 15, 20, and 27.

AT the convention of the Incorporated Municipal Electrical Association, which is to take place at Brighton and at Portsmouth on June 27 to 30, the following papers are to be read and discussed:—electricity supply viewed from the municipal committee's standpoint, by Councillor H. Leese; modern wiring practice, by Mr. J. W. Beauchamp; internal-combustion engines in power stations, by Messrs. H. L. Howard and R. M. Carr. There will also be discussions on purchase of fuel and street and shop-front lighting, opened, respectively, by Mr. C. E. C. Shawfield and Mr. A. H. Seabrook.

THE annual general meeting of the Society of Chemical Industry is to be held in Sheffield on July 12. Dr. R. Messel has been nominated as president, and Sir William Crookes, F.R.S., Dr. G. G. Henderson, and Messrs. H. Hemingway and W. F. Reid have been nominated as vice-presidents.

THE ninety-fourth annual meeting of the Société Helvétique des Sciences Naturelles will be held this year at Soleure from July 30 to August 2. The first general meeting will take place on July 31, when the president for the year, Dr. A. Pfaehler, will give his opening address, and the following lectures will be delivered:—M. Georges Claude, on "La Liquéfaction de l'air, son état actuel et ses applications"; Prof. Ursprung, of Freiburg, on "Der heutige Stand des Saftsteigungsproblems"; Dr. H. Stauffacher, of Frauenfeld, on "Die Rolle des Nucleins bei der Fortpflanzung"; and Prof. Otto Schlaginhaufen, of Zurich, on "Reisen und Forschungen in Melanesien." The second general meeting will be on August 2, for which the following lectures have been arranged:—Prof. Abderhalden, of Berlin, on "Neuere Anschauungen über den Zellstoffwechsel"; Prof. P. Gruner, of Berne, on "Die neueren Vorstellungen über das Wesen der Elektrizität"; and Dr. Albert Brun, of Geneva, on "Les recherches modernes sur l'exhalaison volcanique." The annual meetings of the Swiss societie of botany, chemistry, geology, mathematics, physics and zoology will be held also at Soleure on August 1.

A COLLIERY and General Mining Exhibition, lasting a fortnight, was opened in Manchester on Friday last by Prof. Sir Thomas Holland, K.C.I.E., F.R.S., who in the course of his remarks said the exhibition contained methods for securing safety underground and rescue apparatus for saving life after accidents had occurred. The improved methods of machines on view had an important bearing on the economy of mining, and thus the exhibition would be of service in showing how our natural resources could be turned to full account. He reminded his hearers that large quantities of coal were destroyed in the process of mining it, and that every ounce of coal ore or mineral that was destroyed was destroyed once for all without possibility of replacement. He suggested that, if the colliery owners of Lancashire would get together in groups and employ young geologists to correlate the information that was available, a geological map of the district might be constructed the practical usefulness of which would repay its cost many times over.

THE first International Chemical Engineering and Industries Exhibition was opened on Saturday last at the Royal Agricultural Hall, Islington, by Lord Denbigh.

DR. E. J. RUSSELL, of the Lawes Agricultural Trust, having directed attention to the need and value of photographs illustrating the scenery associated with various geological formations, the Tunbridge Wells Natural History Society is offering for this purpose a series of prizes, of 2*l.* each, for the best set in the following subjects:—first, scenery of the chalk districts—hills, sections, valleys and combes; second, scenery of the Wealden sandstone formation—sections, &c.; third, scenery of the Tertiary beds; fourth, scenery connected with shingle, gravel or sand beds; fifth, river and marsh scenery. Messrs. W. Whitaker, F.R.S., and R. Child-Bayley, editor of *Photography and Focus*, have kindly promised to act as judges. Full details of the competition can be had on application (stamp should be enclosed) to Mr. Geo. Abbott, 2 Rusthall Park, Tunbridge Wells, and the prints should be sent to him on or before March 1, 1912.

ACCORDING to *The Athenaeum*, an expedition to south-east Arabia has been planned by the Danish Royal Geographical Society, the object being the mapping of parts of Oman and the studying of the ancient memorials and commercial prospects of the country.

THE Research Committee of the National Geographic Society of Washington has made an appropriation of 5000 dollars for continuing the glacier studies of the two previous years in Alaska. The work, beginning in June, will be done by Prof. R. S. Tarr, of Cornell University, and Prof. Lawrence Martin, of the University of Wisconsin. who have directed the National Geographic

Society's Alaskan Expeditions of 1909 and 1910 in the Yakutat Bay, Prince William Sound, and lower Copper River regions. The 1911 expedition will study briefly a number of regions of glaciers not previously investigated by the National Geographic Society, although partially mapped by the Alaska Division of the U.S. Geological Survey, the Boundary Commissions, &c. Work will be done on the present ice tongues and the results of glaciation in the mountains and plateaus of parts of the interior and some of the fiords of south-eastern Alaska, the former having lighter rainfall and smaller ice tongues than the Yakutat Bay and Prince William Sound regions.

To *Naturwissenschaftliche Wochenschrift* of April 30 Prof. Branca communicates a popular notice of the dinosaurian remains obtained from the Lower Cretaceous of the Tendaguru Mountains of German East Africa by the recent expedition from Berlin. The most noteworthy feature of these remains, so far as they have been examined, appears to be their gigantic dimensions, which largely exceed those of Diplodocus. The longest rib of the latter measures, for instance, 1·86 m., whereas some of the African ribs are no fewer than 2·50 m. in length. Again, the longest cervical vertebra of the former is 0·64 m., in contrast to which is one from Tendaguru—possibly not the biggest—measuring 2·10 m., while a humerus of the African dinosaur is 2⅐ times as long as the corresponding bone of Diplodocus, measuring 2·10 m. (6 feet 10 inches) against 0·95 m. (3 feet 1 inch). It should, however, be borne in mind, although this is not mentioned by the author, that Diplodocus is not the largest known reptile, its femur measuring 1·542 m., or 5 feet 1¾ inches, against 6 feet 2 inches in that of Atlantosaurus. Still, as the femur is always a much longer bone than the humerus, the advantage is largely on the side of the African reptile. According to the author, the remains previously obtained from East Africa by Dr. Fraas were much larger than those of any other known dinosaur, but these are completely eclipsed by the new specimens. In addition to the dinosaurs, remains apparently referable to pterodactyles have been obtained. Remains have likewise been discovered in several other localities of German East Africa. Prof. Branca adds some remarks in regard to the pose and food of the sauropod dinosaurs, observing that if these reptiles subsisted on a vegetable diet, it is difficult to imagine how they obtained sufficient nutriment. The same difficulty, it may be mentioned, has occurred to another naturalist, Mr. J. Versluys, who has suggested in the *Zool. Jahrb., Abtheil. f. Systemat.*, vol. xxix., p. 425, 1910, that these reptiles fed on fishes. Prof. Branca is also exercised in his mind how the sauropods obtained sufficient calcareous matter for their enormous skeletons; but it may be pointed out that the supply of this substance would increase *pari passu* with the amount of food consumed. In this connection, it may be noted that *The Scientific American* of April 8 contains an illustrated account of the life-sized restorations of dinosaurs recently installed by Mr. Carl Hagenbeck in his Tiergarten at Stellingen, near Hamburg.

Mr. L. L. Woodruff has contributed to the *Archiv für Protistenkunde* (vol. xxi., 1911) a remarkably interesting account of the results which he has obtained in breeding experiments with Paramœcium. Of late years there has been a tendency amongst biologists to accept the view that the multiplication of unicellular organisms by simple fission cannot go on indefinitely, but leads ultimately to exhaustion and even extinction of the family unless the failing vitality be renewed by conjugation. According to Mr. Woodruff, this only holds true when the organisms are exposed to a more or less constant environment. He finds that by subjecting the Infusoria to a varied environment (represented in this case by the culture medium), they can be made to keep on dividing indefinitely in a perfectly normal manner without conjugation or the use of artificial stimulation. The culture on which this conclusion is based has been kept under observation for nearly three and a half years, during which time over two thousand generations of Paramœcium have been produced, giving an average of about one division every fifteen hours.

In the March issue of *The National Geographic Magazine* Messrs. Collins and Doyle, of the U.S. Department of Agriculture, describe a tour in southern Mexico undertaken with the object of investigating the causes of the immunity of the crop in that region from the destructive cotton-boll weevil. The results are not quite conclusive, but it appears that in some districts the practice of planting the cotton crop only in alternate years is a successful method of combating the weevil, and that in other places the boll is found to be naturally protected against its attacks by the abnormal growth of proliferating tissue, or in some cases that the aperture by which the weevil enters the boll was sealed up by the growth of the web of a small jumping spider (*Aysha minuta*).

An interesting article on the plant knowledge that prevailed formerly among the Gosiute Indians is communicated by Mr. R. V. Chamberlin in the Proceedings of the Academy of Natural Sciences of Philadelphia (February). The tribe inhabited the desert region lying to the south-west of the Great Salt Lake in the State of Utah, but nevertheless made very extensive use of plant products for food and medicine. Green vegetables were prepared from the leaves of the composite *Balsamorhiza sagittata* and the umbellifer *Cymopterus montanus*. The tuberous roots of *Carum Gairdneri* were much esteemed, also the bulbs of *Calochortus Nuttalli*. Seeds were gathered from *Salicornia herbacea*, species of Atriplex and Chenopodium, *Sisymbrium canescens*, various composites, *Triglochin maritimum* and *Typha latifolia*; while the "nuts" of *Pinus monophylla*, formerly of necessitous importance, are still collected in quantity. Pharmaceutical remedies were prepared from the roots of *Ferula multifida*, *Valeriana edulis* and *Spiraea caespitosa*, and from the leaves of *Artemisia tridentata*.

The annual report for 1910 issued by the director of Rothamsted Experimental Station reflects to a great extent the unfavourable conditions that prevailed during the summer. The yields of wheat, barley, and grass crops were all low, but mangolds were good, and a second crop of clover on one field was very large. A noticeable feature on the barley plots was the value of phosphate manuring, which becomes more marked in a wet and cold season. Striking evidence was obtained of the beneficial effects which result from preceding wheat with a leguminous crop. A report by the director and Dr. E. J. Russell on the soils in the south-east of England is being published by the Board of Agriculture, and a paper by Miss Brenchley dealing with the weeds prevalent in Rothamsted district is announced.

From the account of the gardens at Llanover, Monmouthshire, contributed by Mr. G. Went to *The Gardener's Chronicle* (May 6), it is evident that natural conditions and careful management have combined to produce a magnificent collection of trees. Mention is made of some fine specimens of *Sequoia gigantea* and a lofty tulip tree, all exceeding a height of 100 feet, and of specimens of *Alianthus glandulosa*, *Abies Smithiana*, and *Pinus excelsa* almost as high. Fuchsias of the types of *globosa* and *Riccartonii* attain large proportions, and a plant of the *nobleanum* variety of *Rhododendron caucasicum* was estimated to cover an area 30 feet in diameter.

A DOUBLE number of *The Indian Forester* (January and February) contains an article on forest railways for the extraction of timber, communicated by Mr. F. A. Leete, in which he describes an original type of monorail experimentally tried in Burma; a note on wood-pulp testing, by Mr. W. Raitt; and a report on the system of afforestation with field crops in Berar. Mr. Raitt states that four Indian conifers, *Picea Morinda*, *Abies Pindrow*, *Pinus excelsa*, and *Pinus longifolia*, yielded long-fibred, strong pulps of good colour and quality, while weaker but useful pulps were obtained from six hard-wood trees, including *Bombax malabaricum*, *Populus ciliata*, and *Ficus bengalensis.*

A THICK volume, issued as vol. xiv., part i., of "Contributions from the United States Herbarium," is devoted to a compilation dealing with the lichens of Minnesota, in which Mr. Bruce Fink presents the data collected and conclusions formulated by several years' field work and study. Under the only American order of Ascolichenes, four suborders, Coniocarpineæ, Graphidineæ, Discocarpineæ, and Pyrenocarpineæ are delimited. The largest family, the Lecideæ, contains eight genera, of which Lecidea, Bacidia, and Buellia are the more important; Cladonia and Lecanora are also large genera. Artificial keys are provided for genera and species, and illustrations for one species of each important genus. Further, to add to its value as a practical handbook, the author has given an introductory account of lichen structures and modes of reproduction. Since the lichen flora of Minnesota is fairly representative of a large portion of the northern area of North America, the volume should be useful to British lichenologists for purposes of comparison.

THE agricultural experiment station attached to the Purdue University, Indiana, has succeeded in coming into very close contact with the farmers by means of educational trains, field trials, and illustrated circulars dealing with various practical questions. The educational train is almost unknown in this country; it consists of a coach for the staff, two "audience coaches," and a "palace-horse" car, in which are kept the animals used for the demonstrations. The train stops at convenient centres, and is met by the local farmers; the staff then give lectures and demonstrations dealing with matters of local interest. Of the popular circulars recently to hand, we need only mention one on wheat, in which stress is laid on the fact that the average yield in Indiana is only 13·3 bushels per acre, whilst on the college farm it is 28 bushels per acre. The farmer is advised how he may make up the deficiency and improve his own crops.

WITH the union of the South African colonies, the issue of separate agricultural journals has become superfluous, and they are now all merged into a new *Agricultural Journal of the Union of South Africa*, issued monthly in English and Dutch by the Department of Agriculture. The first number contains articles on the cultivation of recently introduced crops, cotton, bananas, citrus fruits, and others, and records experiments on partial sterilisation of soil for tobacco seed beds. Dr. Theiler describes "stiff-sickness" in cattle, a disease very similar to laminitis in horses, which he traces to *Crotalaria burkeana*, a plant occurring in the pastures. Altogether the new journal reflects very great credit on all concerned in its production.

THREE diseases of groundnut have been studied by Mr. F. W. South in the West Indies. A rust fungus, *Uredo arachidis*, is of very general distribution both on imported and on local varieties throughout all the islands. The amount of damage it is capable of causing appears to vary in different islands, as does the success of the control measures employed. A leaf-spot fungus, *Cercospora personata*, is more local and not as yet very serious. A root disease caused by a fungus not identified occurs in a number of the islands; its host plants are numerous and of a very general nature. No adequate method of control is known. Mr. South's observations are published in the West Indian Bulletin, vol. xi., No. 3.

WE have received the first report of the Mine Rescue Station Commission of the State of Illinois, which contains some interesting information. Illinois has taken the lead in the United States, and has been the first State to provide a rescue service for its coal mines. Three stations have been built, namely, at Benton, Springfield, and La Salle. In general design and equipment they appear not to differ greatly from those already erected in Great Britain, containing a lecture room, a training chamber, store rooms, &c. Unlike most European rescue stations, they also contain dormitories, which are probably rendered necessary by the conditions of the case; the intention appears to be that men being trained in rescue work should give up their whole time to the training, and should live at the rescue station during their period of training; it seems to be considered that a fortnight should suffice for this purpose. A novel feature here is the provision of a travelling rescue station in the form of an old Pullman car, which has been re-fitted so as to carry rescue appliances, oxygen cylinders, and other requisites; one of these will be attached to each rescue station, where it will stand on a siding ready, so that a locomotive can be coupled up to it and it can at once be taken to the scene of any accident. This idea is well worthy of adoption in other places. Of course, each of the Illinois rescue stations has also its motor-car for road work. The Commission does not express its preference as yet for any one of the numerous forms of rescue appliances that have been designed during the last few years, and rather implies that it has not yet come across any thoroughly satisfactory pattern. Finally, and as perhaps the most important point of all, let it be noted that this is a State enterprise, and that the State pays all expenses, which already amount to some 15,000*l*.

The Journal of Genetics, the first number of the first volume of which appeared in November, 1910, is, as stated in that issue, "a periodical for the publication of records of original research in Heredity, Variation and allied subjects. The Journal," so the announcement continues, "will also, from time to time, contain articles summarising the existing state of knowledge in the various branches of Genetics, but reviews and abstracts of work published elsewhere will not, as a rule, be included." The number before us contains a detailed and copiously illustrated account, by Dr. R. N. Salaman, of his hybridisation experiments with the potato. The characters dealt with pertain to certain morphological features of the leaf and tuber, and also to the colour of the latter. The same laws of dominance do not hold with the wild *Solanum etuberosum* as with the domestic varieties of potatoes. In *S. etuberosum* it was shown that immunity to the attacks of *Phytophthora infestans* is inherited as a recessive character. There is a very interesting paper by F. Keeble and Miss C. Pellew, in which it is shown that the character tallness, treated by Mendel as a single character, is capable of analysis into two characters, length and thickness of internode, which are inherited independently of one another. L. Doncaster and F. H. A. Marshall describe the results of experiments designed, amongst other reasons, to test the hypothesis put forward by Dr. Rumley Dawson in his Causation of Sex, that the right ovary gives rise exclusively to male-producing and the left ovary to female-producing ova. The results do not support Dr. Dawson's view. The journal is well printed and well illustrated, and is of a convenient size. We wish it success, which it will doubtless achieve.

IN *Mitteilungen aus den deutschen Schützgebieten*, Heft 1, K. Langbeck discusses the data obtained by means of self-registering raingauges on the Cameroon mountain. Situated near the equator, and swept by the south-west monsoon winds of the west coast of Africa, almost the heaviest rainfall in the world has been here recorded, Debundja receiving a mean annual rainfall of 10,149 mm., and Bibundi of 10,701 mm., so far as observations go at present. The article deals with the twelve months April, 1909, to March, 1910, and within this period the maximum rainfall occurs during the forenoon in the rainy season, and after midday in the dry months of the year. High values were recorded from 2 a.m. to 10 a.m. between June and October, and from noon to 4 p.m. and 6 to 7 p.m. between November and May. Utilising the data of previous years, a general excess of rainfall between 6 p.m. and 6 a.m. to the extent of about 60 per cent. is found, so that too great reliance must not be placed on a short period only. The investigation, however, is interesting, and as additional material is accumulated these apparent discrepancies will doubtless be explained. In the same number are published two maps of German South-west Africa, scale 1 : 200,000 and 1 : 400,000, which include the coast region from the Orange River up to lat. 26° S. A short description of the geography and the meteorology of the area is also given.

WE have received from the observatory at Rio Janeiro a pamphlet entitled "Codigo Mnemo-Telegraphico," by Sr. N. Duarte, chief of the meteorological section, for the compilation and translation of weather telegrams, &c., by the use of words instead of figures, with the view of preventing mistakes in transmission. The principle bears resemblance to the *technica memoria* sometimes used in schools, with much advantage, for remembering dates, &c., by substituting letters for figures to form words. The present system is ingenious, and when the key is mastered the messages may be composed or deciphered without reference to the code. But it is not at all likely to compete successfully with the international telegraphic code now generally in use.

WE have received from Major R. A. Marriott a pamphlet entitled "Why we may expect Warmer Winters," in which he seeks to revive a theory enunciated by his friend Major-General Drayson, whose scientific merits he wishes should be more fully recognised. We sympathise with his loyalty, but cannot accept his deductions. Major-General Drayson claimed to have discovered a "second rotation of the earth," and it is urged, as we think somewhat disingenuously, that there is evidence to show that General Drayson's reasoning was sound, and that errors have arisen in astronomical calculations from neglect of the principle. The practical effects of the neglect are urged as more important than the theoretical. Astronomers have assigned an erroneous value to the change of the obliquity of the earth's axis to the ecliptic. Instead of being limited to a quite small angle, the obliquity, it is urged, will change as much as 12°, naturally causing very great changes in the climate. Given the change, the result may be admitted, but inasmuch as the annual increment is only 40·9″, and the minimum is not reached until the year 2295, it is evident that from this cause there can be very little effect until after 2680 A.D., for whatever effect is produced in the first 385 years will be as slowly undone in the succeeding period of equal length. The author, of course, has greater scope when he applies his theory to geological changes, as in the case of the Ice age. But here his periods seem to be too short, as for the purposes of ordinary life they are too long. On this point, however, we cannot insist, for we do not know the date of the observed phenomena with sufficient precision to apply calculation. Within historic times, the facts are scarcely borne out. If we compute from General Drayson's data, the obliquity of the ecliptic at the earliest trustworthy observation, 230 B.C., we get the value 24° 19′ 20″, while the observed obliquity was only 23° 51′ 20″; the rate of change is made, therefore, more than twice as great as that of the observed. The price of the pamphlet is a modest penny, but unfortunately the name of the publisher is not given.

THE difficulty of determining the true temperature of the radiating surface has been the greatest obstacle in practically all investigations of the radiating properties of metallic and other surfaces. A method of overcoming this difficulty is described by Mr. C. E. Mendenhall in vol. xxxiii., No. 2 (p. 91), of *The Astrophysical Journal*. In his experiments the author folded a piece of thin, flat, conducting ribbon of, say, platinum, parallel to its length, so that it formed a **V**-shaped cavity, and found that optical pyrometer observations of the temperature within the wedge-shaped aperture, particularly in one with reflecting walls, give the true temperature of the outside surface of which the radiation is to be studied. Various experiments with filaments of pure platinum verified the accuracy of the method.

THE stability of the atom under changes of molecular kinetic energy has been investigated anew by Mr. Harry Clo, who tested the stability by the resistance of the atom to ionisation; previous investigators have failed to find any certain dependence of atomic stability on the temperature. A specially constructed cylinder containing hydrogen or air was surrounded by an electric furnace raised to various measured temperatures, and the contained gas submitted to the ionising influence of the γ rays of radium. The results, published in a paper appearing in No. 2, vol. xxxiii., of *The Astrophysical Journal*, indicate that the ionisation of air is independent of the temperature of the gas to within 0·2 per cent., up to 600° C., and that the same independence is exhibited by hydrogen up to about 430° C.; a variation of above 200 per cent. in the absolute temperature of a gas fails to affect the stability of the atom sufficient to change the ionisation more than about 0·1 per cent.

THE Bulletin of the Imperial Society of Naturalists of Moscow for 1910 contains (pp. 79–212) a long mathematical investigation, by Prof. Ernst Leyst, of formulæ representing the action of one magnet on a second. After dealing with the ordinary simple conception of a magnet as composed of two point poles of opposite sign, Dr. Leyst considers the much more complicated case—applicable to thin-walled hollow cylindrical magnets—where each pole is regarded as a fine circular ring of positive or negative matter. In the most general case the mathematical operations are heavy, and the resulting formulæ long; the coefficient of one single term occupies eight pages. More especial attention is paid to the two standard positions of Gauss and the two standard positions of Lamont. These have been treated with more or less completeness by several previous magneticians, amongst whom Lamont and Borgen are specially mentioned; but, according to Leyst, few if any of his predecessors who have given formulæ for all four cases have wholly escaped printers' errors. Expression is given to the belief that the differences between results obtained for the horizontal component of the earth's magnetic force with different magnetometers are due in large measure to insufficiency in the deflection formulæ employed. There seems, however, no reference to the theoretical or experimental work on this question carried out of late years in this country and in India.

The Electrician for April 14 contains an abstract of the last three of Sir J. J. Thomson's Royal Institution lectures on radiant energy and matter. They dealt with the distribution of energy in the spectrum of a black body, the relation between radiation and absorption of a body, the character of the absorption of gases, and the nature of radiation and of light waves. The same number of *The Electrician* contains a summary of the lecture on the deflection of the positive rays of the vacuum tube as a new means of chemical analysis. Since the ratio of the deflections of a particle in the electric and magnetic fields depends on the quotient of the electric charge carried by the mass of the particle, an examination of the deflections allows some deductions to be made as to the composition and charges of the particles. Oxygen, for instance, appears to exist in the tube in nine modifications, and these help us to understand why the same chemical substance is so often capable of giving entirely different spectra under different conditions.

THE illuminating engineers of America appear to have commenced a crusade against the evil of "glare" in artificial illumination, and the subject is given a prominent place in several of the American scientific journals. *The Scientific American* for April 15 contains an article on light and shadows ministering to eye comfort, by Mr. E. C. Chittenden, of the Bureau of Standards. He considers that the present method of lighting large rooms by lamps concealed in recesses close to the ceiling gives too great uniformity of illumination to be pleasant to the eye, and prefers visible lamp fixtures provided with fittings of prism glass, which send the light in the direction required. According to the April number of *The Illuminating Engineer of New York*, an American Association for the Conservation of Vision has been formed, and the editor sums up a few of the questions at issue as follows:—(1) Is glare so injurious to the eyes as is generally believed? (2) Is indirect lighting good or bad? (3) Is the Cooper-Hewitt lamp injurious to the eyes?

A SUPPLEMENT to *The Electrician* of May 12 devotes nearly 200 pages to special articles on the present position of electric power in mining. Since the corresponding supplement was issued three years ago, new rules have been issued by the Home Office dealing with the use of electrical appliances in mines, and one of the articles is devoted to the elimination of risk from explosion and from shock in the use of electricity. Other articles deal with the supply of power, either from a public or from a private station to the colliery, the winding plant, the wiring of the mine, coal-cutting machinery, haulage plant, pumps, switches, and electric hand lamps. Each is written by a man well qualified to deal with his subject, *e.g.* Prof. W. M. Thornton, Mr. H. J. S. Heather, and Mr. W. B. Shaw.

MESSRS. NEGRETTI AND ZAMBRA have submitted to us a pair of folding prismatic binoculars, which we have carefully tested. The chief feature is the manner in which the binoculars may be folded for ease in carrying to fit into a case 3½ inches wide and only *one inch thick*. This is achieved by mounting the prism in which the first two reflections occur separately from the prism producing the last pair of the four reflections of the usual prismatic system. This has not resulted in any sacrifice either in power, aperture, or—so far as we can see—in illumination. We have ascertained that the magnification and field of view as given by the makers, viz. 5·5 diameters and 8·3°, are approximately correct, and these compare very well with the ordinary prism-binocular. The focussing is smooth, the introcular distance can be adjusted, and for a small range the focus can be separately adjusted for each eye. The only criticism we have is of the spring catches which hold it in position for use, which do not appear quite strong enough. Incidentally, the glasses provide very interesting evidence of the power we possess of rotating our eyes in their sockets (by means of the oblique muscles). If the spring catches are released while looking through the glasses, and the bodies are slightly rotated, as in folding them, the images seen by the two eyes rotate in *opposite* directions. It will be found that for a few degrees either way the eyes are able to follow, and to fuse the images into one.

IN the paragraph on a fresh-water rhizocephalan in our last week's issue, the *Records of the Indian Museum* is quoted as *Records of the British Museum*.

OUR ASTRONOMICAL COLUMN.

THE BRIGHT METEOR OF APRIL 30.—Mr. Harrison Hill, of Abbey Road, N.W., writes to say that he also observed the brilliant meteor which was seen, as reported in these columns last week, by the Rev. T. E. R. Phillips. At midnight on April 30 Mr. Hill's attention was arrested by a sudden and bright light, which appeared to be a large star, in the S.W. sky. This object increased rapidly in size and apparent brightness, and then disappeared. Although Mr. Hill has frequently observed "shooting stars," this meteor especially impressed him by reason of its lack of apparent motion and its exceeding brightness.

THE SPECTRUM OF NOVA LACERTÆ.—A comprehensive study of the spectrum of Nova Lacertæ is published in No. 194 of the Lick Observatory Bulletins by Prof. W. H. Wright. Spectrograms were secured early in January with spectrographs attached to the 36-inch and 12-inch refractors, but subsequent observations were prevented by a protracted storm which set in after January 6. Altogether, some 140 wave-lengths are given as positions of lines, or as maxima, minima, or limits of bands. As remarked by Prof. Wright, the interpretation of this complex structure of the spectrum is a difficult problem in which great caution must be used. There is one point to which he directs specific attention, however. In the comparison iron-spark spectrum the air lines appear as usual, and show a large measure of agreement with many of the bright-band maxima in the star This is shown by a table comparing the nitrogen wave lengths given by Exner and Haschek and Neovius with the stellar wave-lengths. But it should be noted that the strongest nitrogen line, λ 3995, is absent from the star spectrum, as are also some of the fainter lines in the spectrum of the gas; neglecting the lines of intensity two and less, there is, however, a striking agreement except for some discrepancies in wave-length such as might easily occur in the measures of the involved nova spectrum. This is interesting and suggestive, but, as Prof. Wright says,